



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification<sup>4</sup> :

H04N 3/36, G03B 23/00

A1

(11) International Publication Number:

WO 89/ 06890

(43) International Publication Date:

27 July 1989 (27.07.89)

(21) International Application Number: PCT/US88/04686

(22) International Filing Date: 29 December 1988 (29.12.88)

(31) Priority Application Number: 142,991

(32) Priority Date: 12 January 1988 (12.01.88)

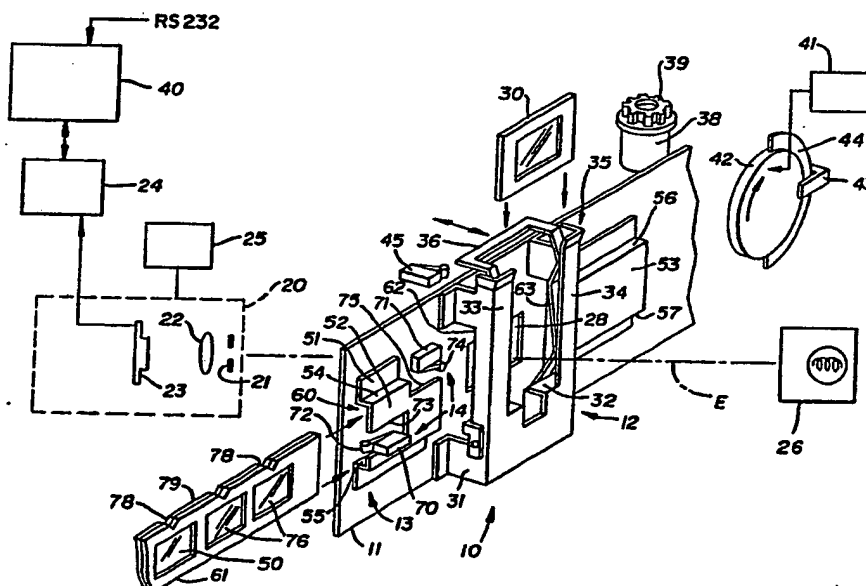
(33) Priority Country: US

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pean patent), FR (European patent), GB (European  
patent), JP, NL (European patent), SE (European pa-  
tent).

Published

With international search report.

(54) Title: MECHANISM FOR HANDLING SLIDES AND FILM STRIPS



(57) Abstract

Apparatus (10) for positioning film media (30, 50) in alignment with video imaging means includes frame means having a window (28), primary gate means (12) mounted on the frame means for holding film media in a first plane, secondary gate means (13) mounted on the frame means for holding film media in a second plane, and, sensor (14) for detecting the presence or absence of film media whereby the video imaging means is caused to move with respect to the primary and secondary gate means to focus on the film media. A carrier (61) comprising a base (80) and cover (81) is provided with a channel (83) for filmstrips (50). The base and cover snap together for the removal and insertion of filmstrips. A plurality of notches (78) are associated with each frame (76) for accurate positioning of the filmstrip.

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MECHANISM FOR HANDLING  
SLIDES AND FILM STRIPS

## TECHNICAL FIELD

5 The present invention is related generally to apparatus for transferring silver halide images into video signals for projection onto a television screen or storage on video recording devices. More particularly, the present invention provides a film carrier mechanism which can hold slides as well as film-strips, presenting each frame in front of a lens and video sensor.

## BACKGROUND ART

15 With the continued development and availability of video recording/playback equipment, an interest in the conversion of images stored on filmstrips and slides into video signals has developed. Video sensors and related video processing electronics are known which convert silver halide images to video signals which can be stored and played back as desired. By storing a plurality of these images, the need for employing projectors, screens and large number of slides can be reduced to a single video tape cartridge that can be readily viewed with any video playback unit, or VCR, of the proper format and a television.

20 Such devices are useful first for the conversion of existing libraries of slides and filmstrips which may be very bulky as well as old and valuable. Also, given the high quality and resolution of 35mm cameras, it is possible to capture still images of various objects in significantly higher quality than by using existing video cameras. Yet, when these images from either

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source are stored on video tape, they can be readily and conveniently viewed for commercial use, entertainment as well as educational purposes.

In order to convert filmstrips and slides  
5 into video signals, the silver halide image is properly illuminated and positioned directly in front of the video sensor which scans and converts the image before it. When it is desired to convert many such images comprising perhaps hundreds of  
10 separate frames, a mechanism is required that can present the strips and slides accurately, repeatedly, and readily before the sensor.

While apparatus is available for such conversion of filmstrips and slides into electronic  
15 signals for magnetic storage, the known devices may not be capable of handling both filmstrips and slides, and the means for presenting a plurality of frames in a single position for rapid focusing and imaging have left much to be desired. Devices for  
20 transporting and positioning film strips and slides are known for a variety of projection equipment which must also locate a frame, in this instance, between a source of illumination and a lens, for viewing.

25 One manner by which a filmstrip can be correctly and separately positioned is by employing a notch at regular intervals which allows the strip to stop in proper registry. U.S. Pat. No. 3,232,167, for instance, provides a sound scanning  
30 assembly for a filmstrip projector. The filmstrip provides a plurality of picture areas and associated sound recording areas therebetween. A like plurality of notches are cut in one of the longitudinal edges of the strip, each notch being  
35 associated with a single sound area. The notches

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provide that on sound recording will be presented with one picture and they also control the transport mechanism for the sound scanning mechanism. Thus, the notches are employed to open and close a switch  
5 which, in turn, allows a scanning drum to travel axially in relation to the filmstrip as it moves transversely thereacross.

U.S. Pat. No. 3,905,694 provides a slide projector. A slide train is employed for carrying a  
10 plurality of linked slides and the train carries a plurality of notches by which one of several lugs, manually driven, advance the slides into illumination and projection.

Despite the existence of such carriers for  
15 the projection of filmstrips and slides, there exists a need for an apparatus that allows for the movement and positioning of multiple frames in video processing equipment. Such equipment provides a video processor and requires that it be positioned  
20 automatically in separate planes for filmstrips and for slides.

#### DISCLOSURE OF THE INVENTION

It is, therefore, an object of the present invention to provide an apparatus for receiving and  
25 holding film media in equipment for video processing.

It is another object of the present invention to provide an apparatus that can handle filmstrips and slides.

It is yet another object of the present  
30 invention to provide an apparatus that signals the video processing equipment of the presence of film media and whether the media is a filmstrip or slide.

It is still another object of the present invention to provide a carrier for filmstrips that  
35 can be employed with the aforesaid apparatus.

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These and other objects, together with the advantages thereof over known apparatus, which shall become apparent from the specification which follows, are accomplished by the invention as hereinafter described and claimed.

In general, apparatus for positioning film media in alignment with video imaging means comprises frame means having a window, primary gate means mounted on the frame means for holding film media in a first plane, secondary gate means mounted on the frame means for holding film media in a second plane, and, sensor means for detecting the presence or absence of film media whereby the video imaging means is caused to move with respect to the primary and secondary gate means to focus on the film media.

The present invention also provides a carrier which comprises base means providing a channel for receipt of the filmstrip and a plurality of frame windows corresponding to the frames on the filmstrip, provided in the channel; cover means providing a plurality of frame windows corresponding to the frames on the filmstrip and, fastening means provided on the base and cover means whereby the base and cover means can be snapped together to hold a filmstrip therein.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of the apparatus of the present invention, in conjunction with circuitry and related structure depicted schematically for producing video images;

Fig. 2 is a side elevation of the apparatus of the present invention depicted in relation to a lens and sensor for video imaging;

Fig. 3 is a perspective view of a carrier

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for filmstrips depicting the placement of film media therein; and

Fig. 4 is a perspective view of the carrier of Fig. 3, depicting schematically the function of notches provided along the edge.

#### PREFERRED MODE FOR CARRYING OUT THE INVENTION

As noted hereinabove, film media such as slides carrying positive silver halide images and filmstrips carrying negative or positive silver halide images can be converted to digital signals via video processing equipment which signals can then be directed to television or related viewing equipment or to a video recorder. The video processing equipment includes a lens and a video sensor which can be positioned to focus on a frame of the film media. In addition to focusing and alignment, the video processing equipment can also zoom in on the film media as well as rotate along an axis of alignment passing between the video processor and the frame being scanned or imaged.

The apparatus of the present invention is particularly useful with such video processing equipment where it serves quickly to signal the type of film media and plane of focus, as will become apparent later, and also to hold the individual frames firmly, in optical alignment with the sensor mechanism. Of course, the apparatus of the present invention can find use with other video processing equipment and thus, its use is not to be limited solely to any specific type thereof.

The apparatus for positioning film media according to the present invention is depicted in the drawings by the numeral 10. It includes generally a frame member 11, primary gate means 12 for holding film media in a first plan, secondary

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gate means 13 for holding film media in a second plane and sensor means 14 for detecting the presence or absence of film media whereby the video imaging means can focus on the film media.

5 In Fig. 1, the apparatus 10 has been depicted with a schematic diagram of a mechanism for converting film images to video signals, indicated generally by the numeral 20. Mechanism 20, in turn, provides an aperture 21 for controlling the amount  
10 of light; a lens 22 for focusing the film media; a video sensor 23 and video processing electronics 24. A focusing motor 25 is also provided for moving the mechanism 20 to focus on at least the first and second planes. As will be appreciated by those  
15 skilled in the art, the mechanism 20 has been greatly simplified herein. Thus, additional drive motors (not shown) can be provided to move the mechanism 20 horizontally or along the X-axis; vertically or along the Y-axis; and rotationally.  
20 Zooming is also possible and requires movement of the mechanism 20 toward and away from the film media or along the Z-axis while at the same time changing the relative distance between the lens 22 and video sensor 23. A motor can also be provided to open and  
25 close the aperture 21 which can be controlled manually or automatically as is known in the art. Of course, it should be appreciated that the present apparatus 10 is not necessarily limited by any particular mechanism 20.

30 A suitable illumination source 26 is provided "behind" the apparatus 10 so that the film media carried therein can be scanned and imaged by the mechanisms 20. The light and film image are "projected" through a window 28, provided in frame  
35 11. As should begin to be evident, complicated

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slid and film handling can be avoided by holding the film media simply and stationary in the apparatus 10 and moving the lens and sensor relative to the film media.

- 5           One type of film media is slides 30 which are held in primary gate means 12. Primary gate means 12 comprises a housing 31 mounted on the frame 11 by welding or screws or other suitable means not shown. The housing 31 is open at the rear and
- 10 provides shelf 32 and vertical walls 33 and 34 which together form a gate 35 for receipt of a slide 30. A spring material pressure pad 36 yields for insertion and removal of slides 30 and holds each firmly within gate 35.
- 15           The slides 30 are gravity fed from a Kodak Carousel 80 Slide Tray, or equivalent, into slide gate 35 where they are clamped into place by pressure pad 36. A tray motor 38 turns sprocket 39 which engages pins on the underside of the slide
- 20 tray to access slides randomly upon user input through a front panel control (not shown) or an RS-232 input associated with a microprocessor 40. A cam motor 41 rotates a cam 42 which actuates levers for the functions of slide lift, slide registration,
- 25 tray location and slide clamp. These levers are not shown in Fig. 1 but all operate functions at the